

**EMERGENCY ACTION PLAN**

**JAWBONE DAMS AND DIKES**

**City of Harlowton  
Harlowton, Montana 59036**

July 1, 1995

Revised:

Jan 6, 1997

Mar 20, 2001

*updated 6/11/02*  
6-3-04

*May 10, 2006*  
*April 18, 2007*  
*Aug 13, 2009*

If Jawbone Dam No. 1, Dam No. 2, or Dike No. 1 are failing or failure seems imminent,  
call:

Wheatland County Sheriff.....911



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## I. INTRODUCTION.

### A. Purpose

The purpose of this emergency action plan (EAP) is primarily to safeguard the lives of and secondarily to reduce property damage to the downstream citizens of Wheatland County and the City of Harlowton, in the event of flooding caused by a failure of the Jawbone Dams or Dikes.

### B. Description of Dam

The Jawbone Flood Control Project is in Wheatland County, in Sections 21 and 22, Township 8 North (T8N), Range 15 East (R15E), located north of the City of Harlowton. It is owned by the City of Harlowton, Harlowton, Montana 59036, and is being used for flood control. Technical data pertaining to Jawbone Flood Control Dams and Dikes and their structures are shown in Appendix A.

### C. Access to Dams and Dikes

Jawbone Dam No. 1 and Dike Nos. 1 and 2 form the upper reservoir of the flood control system. Jawbone Dam No. 1 and Dike No. 1 are located on the Jawbone Creek Country Club golf course, just east of H Avenue N.W.. Dike No. 2 is on private property, just west of H Avenue N.W. and the golf course. The spillway for the upper reservoir is on private property just south of the airport and discharges into Lehi Creek. **Note that if water starts to rise in the upper reservoir, it will flood H Avenue N.W.! If water discharges from the upper reservoir spillway, it may flood Highway 12 at the Lehi Creek Crossing!**

Jawbone Dam No. 2 forms the lower reservoir of the system and is located just southeast of the Jawbone Creek Country Club golf course and north of Fourth Street in the City of Harlowton. **Note that if either Dam No. 1, Dam No. 2, or Dike No. 1 fail, the flood wave will enter the City of Harlowton and flood city streets and Highway 12 along Jawbone Creek!**



The nearest telephone is at the Jawbone Creek Country Club (632-4206). This phone is only available seasonally.

D. Hazard Area

The evacuation area for Jawbone Dam No. 1, Dam No. 2, and Dike No. 1 extends along Jawbone Creek through the City of Harlowton to the Musselshell River, as shown in the map in Appendix B. Hazards below the dams and dike include the possible inundation of occupied dwellings, city streets and parks, and Highway 12. The evacuation area for the spillway for the upper reservoir extends along Lehi Creek to the Musselshell River. Hazards below the spillway include the possible inundation of Highway 12, Highway 191, occupied dwellings, and the city park. Inundation and evacuation maps are in Appendix B.

E. Responsibility and Authority

Pursuant to the Dam Safety Act, Chapter 15 of Title 85, MCA, the dam owner is responsible for production, coordination, maintenance, and implementation of this emergency action plan. The extent of owner implementation was defined through coordination of this plan with the city police, county sheriff and the disaster and emergency services (DES) coordinator.

F. Periodic Review / Update

The Dam Owner shall review/update this EAP annually. Review/update by a qualified professional engineer will be accomplished as required by the dam's operating permit, but no less than every five years.



G. Approval

By my signature, I acknowledge that I, or my representative, have reviewed this plan and agree to the tasks and responsibilities assigned herein for my department and/or agency.

\_\_\_\_\_  
Signature                      Date  
DAM OWNER, MAYOR, CITY OF HARLOWTON

\_\_\_\_\_  
Signature                      Date  
WHEATLAND COUNTY SHERIFF'S DEPARTMENT

\_\_\_\_\_  
Signature                      Date  
DISASTER AND EMERGENCY SERVICES

\_\_\_\_\_  
Signature                      Date  
CITY OF HARLOWTON POLICE DEPARTMENT



## II. NOTIFICATION PROCEDURES

### A. Imminent or Actual Failure

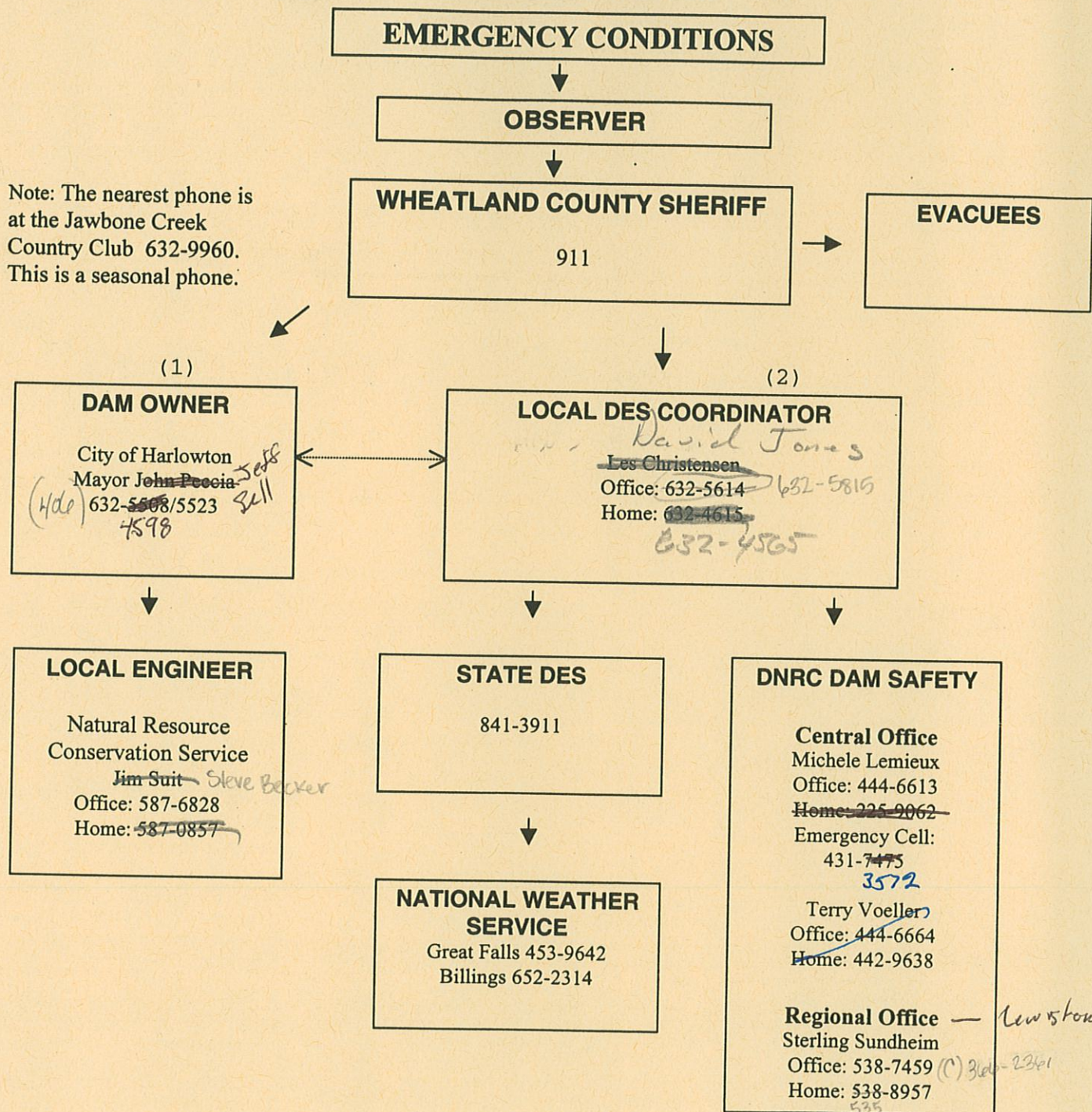
If JAWBONE DAMS OR DIKE IS FAILING, TWO THINGS MUST BE DONE

IMMEDIATELY:

- (1) Residents in the hazard area downstream from the dams and dike must be warned according to the county warning plan, and initiated as shown in Figure 1, and
- (2) any steps that might save the dams or dike or reduce damage to the dam or hazard area downstream should be taken. (Refer to the map in Appendix B to determine the areas that are likely to be inundated if the dams or dike fail).



**FIGURE 1  
JAWBONE DAMS AND DIKE  
ACTUAL OR IMMINENT FAILURE  
"NOTIFICATION FLOW CHART"**



*Sam Johnson - Billings*  
(406) 247-4423  
(406) 896-0871  
(406) 670-9691



As Dam Owner, it is your responsibility to:

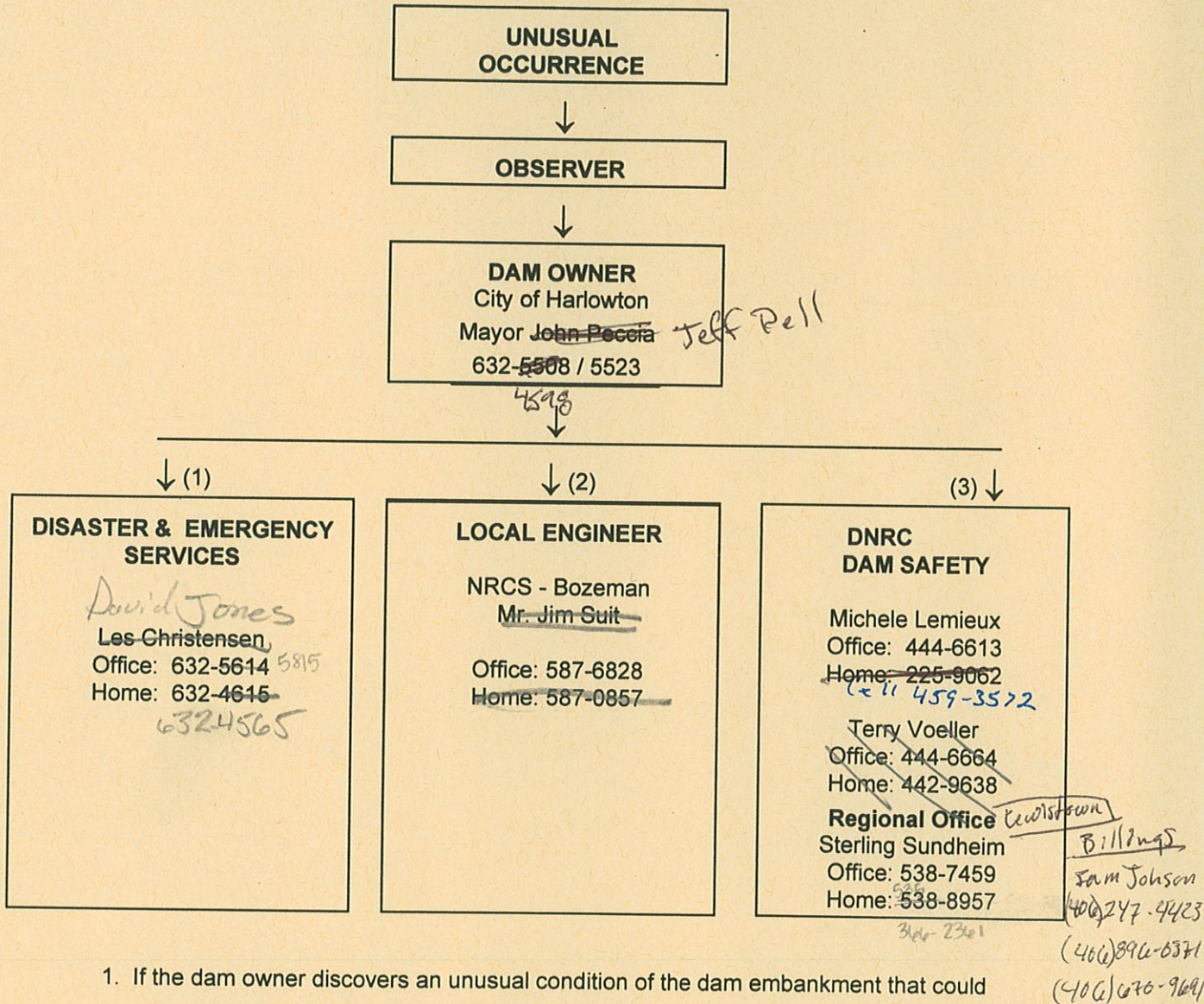
1. Call the Wheatland County Sheriff's Dispatch Center (911) and Disaster and Emergency Services (632-5614). Be sure to say, "This is an emergency." They will call other authorities and the media and begin the warning plan.
2. Warn anyone in immediate danger to evacuate to safety. This includes someone on the dam, directly below the dam, or boating on the reservoir, or downstream evacuees, if so directed by the sheriff.
3. Contact the Disaster and Emergency Services staff at least once every hour. They may request your assistance in evacuating residents.
4. If all means of communication are lost:
  - a. Try to find out why
  - b. Get someone else to try to reestablish communications. If these means fail, take care of immediate problems and send someone to get to another radio or telephone that works.

B. Potentially Hazardous Situation

A potentially hazardous situation is an event or condition not normally encountered in the routine operation of the dam and reservoir. Among the unusual occurrences that may affect the dam are dam embankment problems (see section B.2.), failure of the spillway or outlet works, heavy precipitation or rapid spring snow melt, landslides, earthquakes, erosion, theft, vandalism, acts of sabotage, and serious accidents. These occurrences may endanger the dam, the public, or the downstream valley and may necessitate a temporary or permanent revision of the dam's operating procedures. Help in these situations can be obtained by notifying those people shown in Figure 2.



**FIGURE 2  
JAWBONE DAMS AND DIKE  
POTENTIALLY HAZARDOUS SITUATION  
NOTIFICATION FLOW CHART"**



1. If the dam owner discovers an unusual condition of the dam embankment that could threaten the structure:
  - a. Have a qualified engineer inspect the dam as soon as possible to determine whether emergency action is necessary.
  - b. Notify the county Disaster and Emergency Services Coordinator (632-5614) of the potential problem.



- c. Contact the Dam Safety Program (~~444-6613/6664~~) of the Department of Natural Resources and Conservation (DNRC).
2. Among the conditions the dam owner should watch for are:
  - a. Overtopping of the dam by floodwaters
  - b. Loss of material from the dam crest due to storm wave erosion
  - c. Slides on either the upstream or downstream slope of the embankment as evidenced by
    1. Sloughing
    2. Cracking
    3. Bulging
    4. Scarping
  - d. Erosional flows through, beneath, or around the embankment as evidenced by
    1. Excessive seepage
    2. Discoloration of the seepage
    3. Boils on the downstream side
    4. Sinkholes
    5. Changes in the flow from drains
  - e. Failure of outlets or spillways due to clogging or erosion
  - f. Movement of the dam on its foundation as evidenced by
    1. Misalignment
    2. Settlement
    3. Cracking
3. Before calling either an engineer or DNRC to report a problem, the dam owner shall use the form in Appendix D to ensure sufficient information is provided for the engineer to analyze the problems. After talking to the engineer, it may be helpful to document the condition of the dam



by making a sketch on the form in Appendix D, showing the extent of the problem. Revise the sketch periodically if the problem develops further. Section III includes further guidelines for courses of action to take to mitigate the effect of many problems.

C. Posting of the Notification Flowchart and Distribution of the EAP.

The Notification Flowchart and a copy of the EAP is at the Mayor's office at the City/County building in Harlowton and at the Jawbone Creek Country Club. The Harlowton Police Department, the Wheatland County Sheriff's Office and the Wheatland County DES Coordinator have copies of the plan.

III. MITIGATION ACTIONS

Besides normal monitoring of the dam's condition, which is done at least monthly, the owner will provide continuous monitoring and inspection during and after extreme events such as storms and earthquakes. Information on the magnitude of an earthquake or storm can be obtained from the DNRC Dam Safety Program (~~444-6613/6664~~). Actions are suggested below to mitigate problems that may develop, but those actions should never be continued at the risk of injury or at the expense of lessening efforts related to evacuation. Monitoring should identify any of the following potential problems.

A. Potential Problems and Immediate Response Actions

1. OVERTOPPING BY FLOOD WATERS

- a. Open outlet to its maximum safe capacity.
- b. Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.
- c. Provide erosion-resistant protection to the downstream slope by placing plastic sheets or



other materials over eroding areas.

- d. Divert flood waters around the reservoir basin, if possible.
- e. Create additional spillway capacity by making a controlled breach in a low embankment or dike section where the foundation materials are erosion-resistant.

## 2. LOSS OF FREEBOARD OR DAM CROSS SECTION DUE TO STORM WAVE EROSION

- a. Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.
- b. Lower the water level to an elevation below the damaged area.

## 3. SLIDES IN THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT

- a. Lower the water level at a rate and to an elevation considered safe, given the slope condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.
- b. Stabilize slides on the downstream slope by:
  - (1). weighting the toe area with additional soil, rock, or gravel, and then
  - (2). restoring lost freeboard by placing sandbags at the crest.

## 4. EROSIONAL FLOWS THROUGH THE EMBANKMENT, FOUNDATION, OR ABUTMENTS

- a. Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).
- b. Lower the water level until the flow decreases to a non-erosive velocity or stops.
- c. Place a protective sand-and-gravel filter or boil ring over the exit area to hold materials in place.



5. FAILURE OF APPURTENANT STRUCTURES SUCH AS OUTLETS OR SPILLWAYS
  - a. Implement temporary measures to protect the damaged structure, such as closing an outlet or protecting a damaged spillway with riprap.
  - b. Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.
6. MASS MOVEMENT OF THE DAM ON ITS FOUNDATION (SPREADING OR MASS SLIDING FAILURE)
  - a. Immediately lower the water level until excessive movement stops.
7. EXCESSIVE SEEPAGE AND HIGH LEVEL SATURATION OF THE EMBANKMENT
  - a. Lower the water to a safe level.
  - b. Continue frequent monitoring for signs of slides, cracking or concentrated seepage.
8. SPILLWAY BACKCUTTING, THREATENING RESERVOIR EVACUATION
  - a. Reduce the flow over the spillway by fully opening the main outlet.
  - b. Provide temporary protection at the point of erosion by placing sandbags, riprap materials, or plastic sheets weighted with sandbags.
  - c. When the inflow subsides, lower the water to a safe level.
9. EXCESSIVE SETTLEMENT OF THE EMBANKMENT
  - a. Lower the water level by releasing it through the outlet pumping, siphoning, or a controlled breach.
  - b. If necessary, restore freeboard, preferably by placing sandbags.



B. Emergency Embankment Materials and Resources

There is embankment material for emergency use located one block north of Wheatland Memorial hospital.

C. Local Contractors and Engineers

Local Contractors:

Debuff Backhoe Service  
632-4534  
Box 523  
Harlowton, Montana 59023

Engineer:

NRCS - Bozeman  
Jim Suit, 587-6828 (work) and 587-0857 (home)



## APPENDICES







## APPENDIX A

### Technical Data for Jawbone Dams and Dikes



## APPENDIX A

### Technical Data For Jawbone Dams and Dikes

#### Maximum Reservoir Capacity to the Crest of the Dam:

Dam No. 1 (Upper Reservoir) ..... **1933 acre-feet**

Dam No. 2 (Lower Reservoir) ..... **113 acre-feet**

#### Normal Reservoir Capacity Measured to the Principal Spillway Drop Inlet:

Dam No. 1 (Upper Reservoir) ..... **40 acre-feet**

Dam No. 2 (Lower Reservoir) ..... **0 acre-feet**

#### Maximum Height:

Dam No. 1 ..... **31 feet**

Dike No. 1 ..... **13 feet**

Dam No. 2 ..... **36 feet**

#### Crest Width:

Dam No. 1 ..... **14 feet**

Dike No. 1 ..... **11 feet**

Dam No. 2 ..... **14 feet**

#### Length of Crest:

Dam No. 1 ..... **650 feet**

Dike No. 1 ..... **780 feet**

Dam No. 2 ..... **430 feet**

#### Principal Spillway Outlet Capacity:

Dam No. 1 (Upper Reservoir) ..... **51 cubic feet per second**

Dam No. 2 (Lower Reservoir) ..... **53 cubic feet per second**



Emergency Spillway Capacity:

Upper Reservoir.....140 cubic feet per second

Lower Reservoir.....400 cubic feet per second

Date Constructed.....1967

Slope of Upstream Face (Horizontal to Vertical):

Dam No. 1 .....2.88 to 4:1

Dike No. 1 .....2.67 to 4:1

Dam No. 2 .....3.04:1

Slope of Downstream Face (Horizontal to Vertical):

Dam No. 1 .....2.14:1

Dike No. 1 .....2.36:1

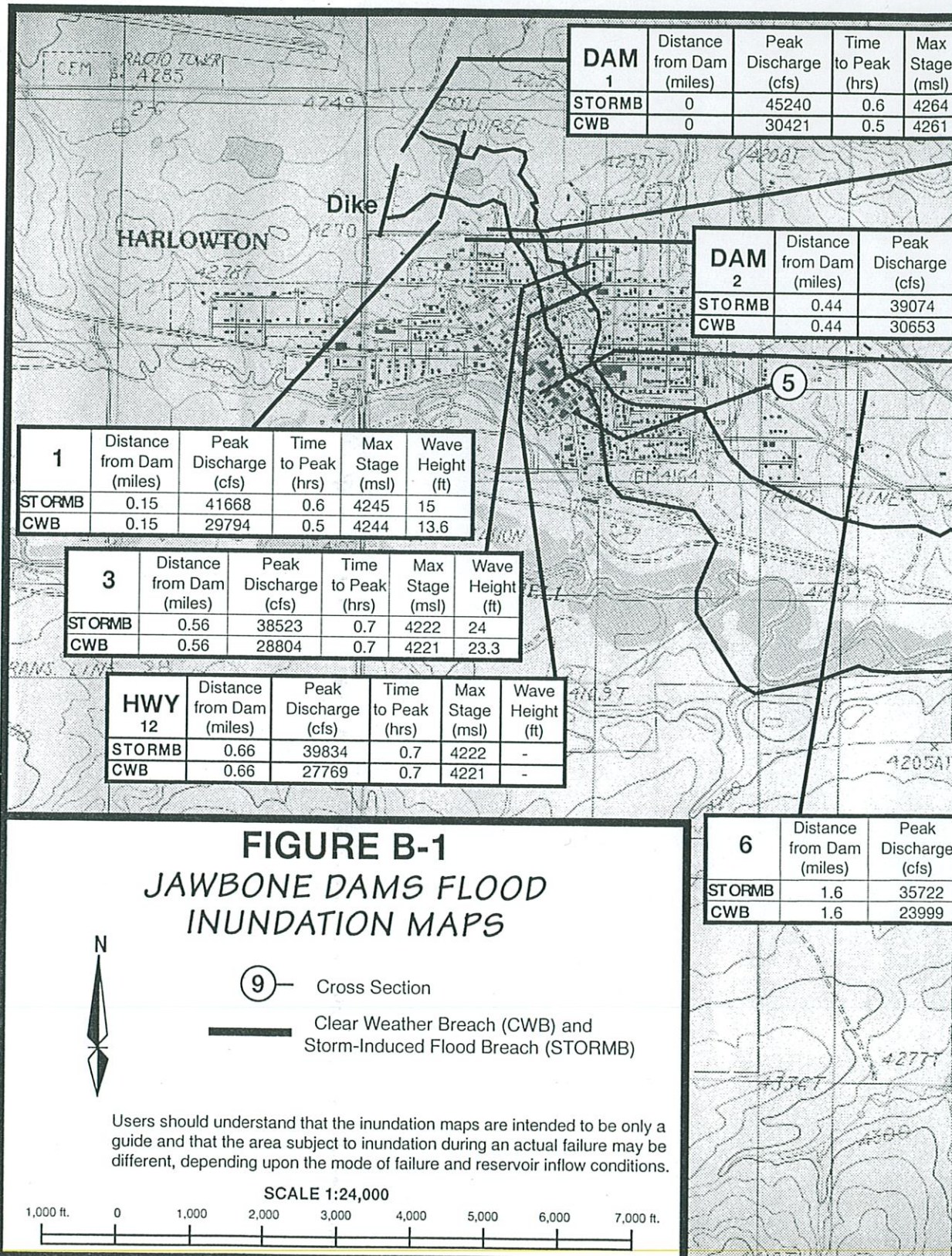
Dam No. 2 .....1.98:1



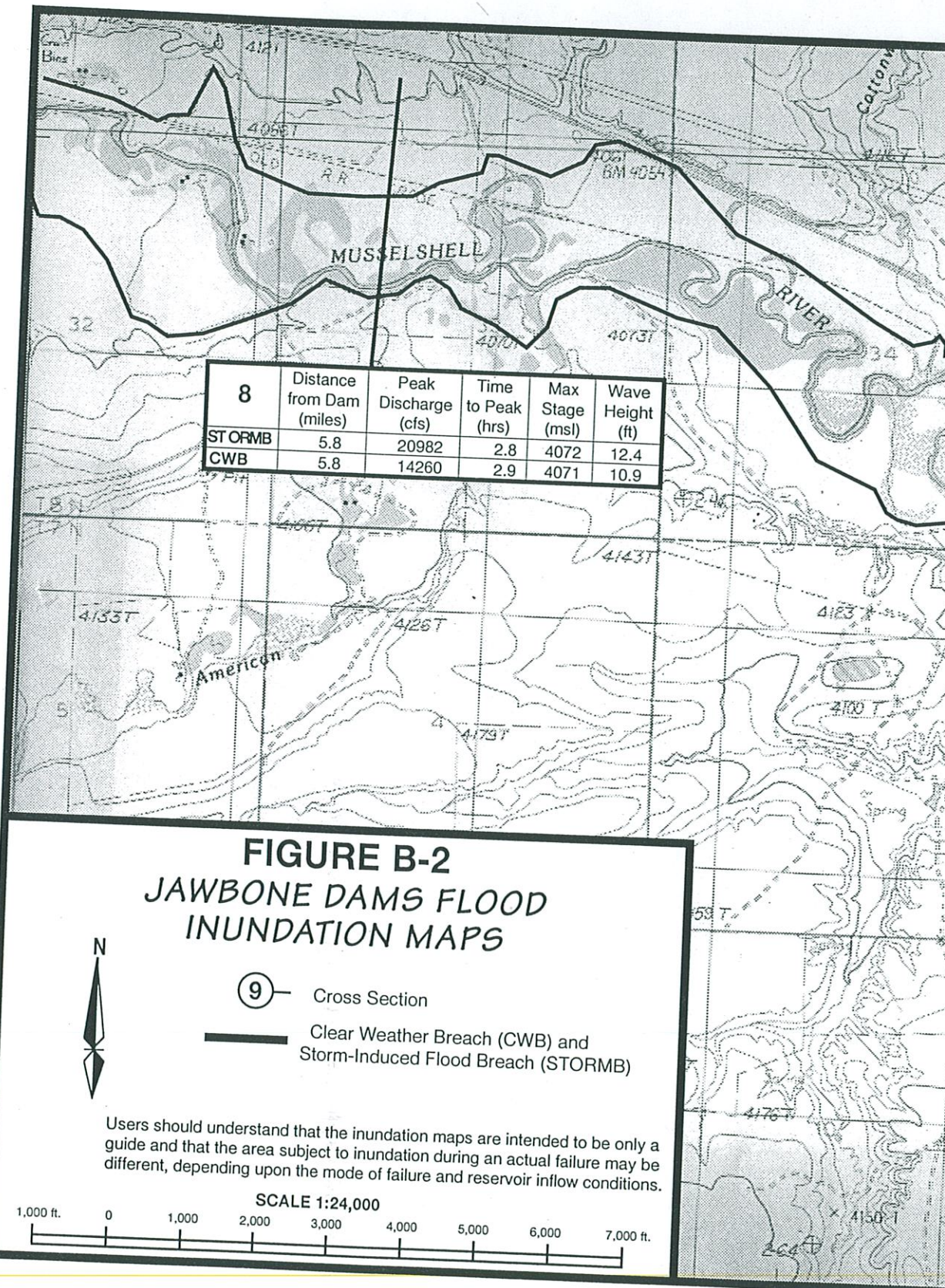
## APPENDIX B

### Inundation and Evacuation Maps











# **FIGURE B-3** **BONE DAMS FLOOD** **UNDATION MAPS**

⑨ — Cross Section

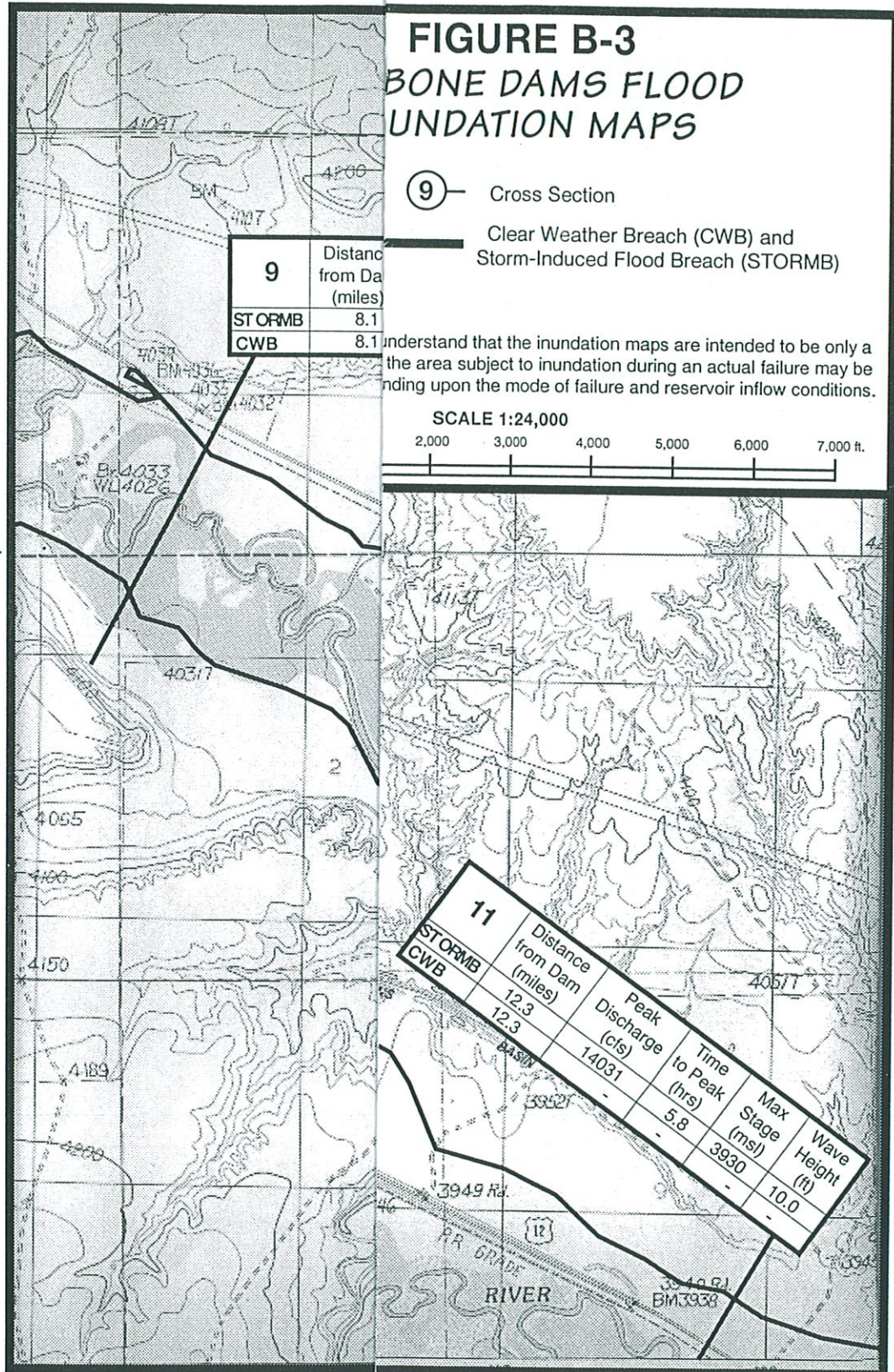
Clear Weather Breach (CWB) and  
Storm-Induced Flood Breach (STORMB)

9	Distance from Dam (miles)
STORMB	8.1
CWB	8.1

Understand that the inundation maps are intended to be only a  
the area subject to inundation during an actual failure may be  
depending upon the mode of failure and reservoir inflow conditions.

SCALE 1:24,000

2,000 3,000 4,000 5,000 6,000 7,000 ft.





# FIGURE B-4 BONE DAMS FLOOD UNDATION MAPS

⑨ — Cross Section

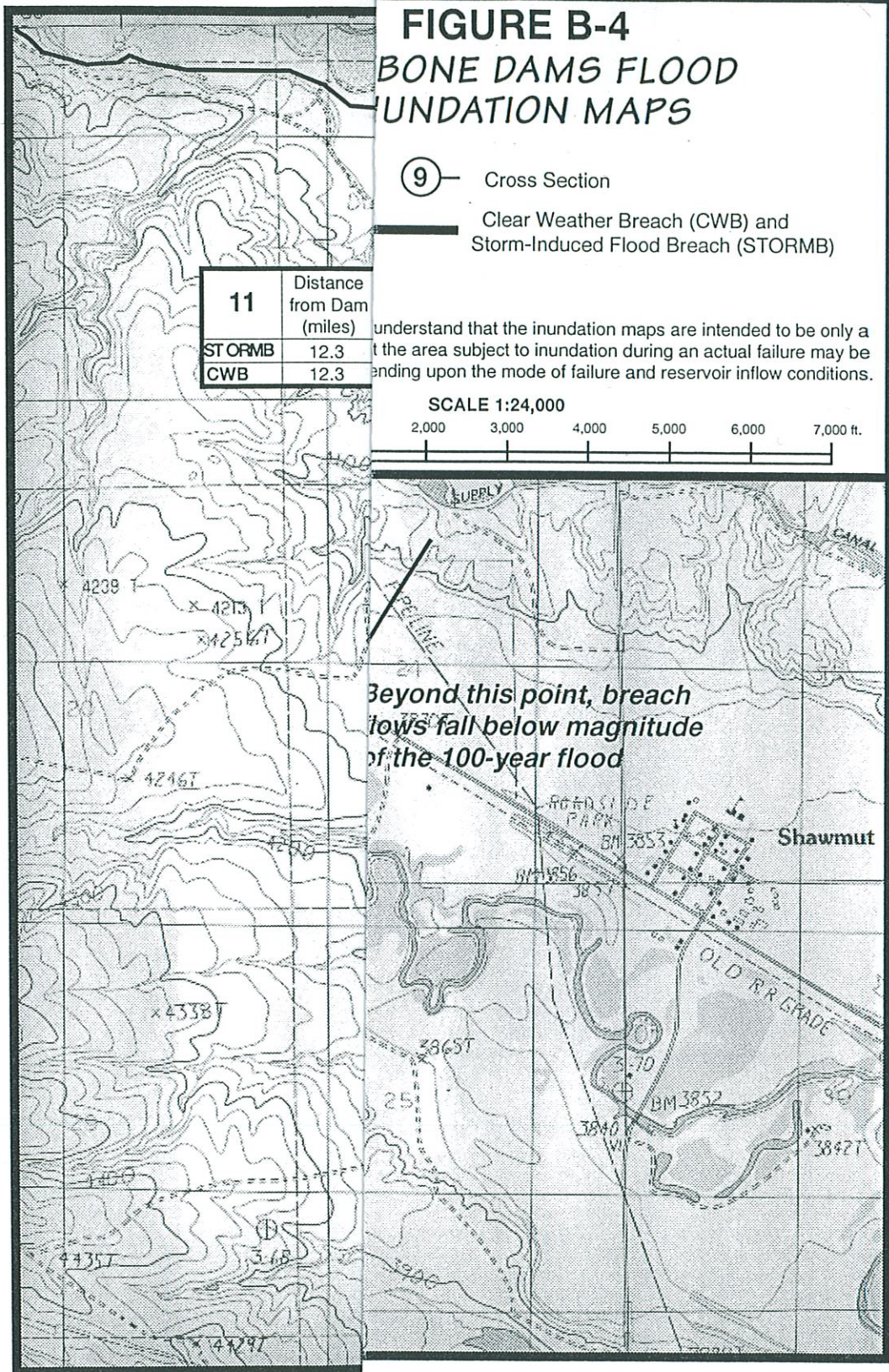
— Clear Weather Breach (CWB) and  
Storm-Induced Flood Breach (STORMB)

11	Distance from Dam (miles)
STORMB	12.3
CWB	12.3

understand that the inundation maps are intended to be only a  
t the area subject to inundation during an actual failure may be  
ending upon the mode of failure and reservoir inflow conditions.

SCALE 1:24,000

2,000 3,000 4,000 5,000 6,000 7,000 ft.





APPENDIX C  
Telephone Directory



Appendix C  
TELEPHONE DIRECTORY

A. Priority One

1. POLICE City of Harlowton ..... 911
  2. SHERIFF Wheatland County ..... 911 (632-5614)<sup>5614</sup>
  3. DISASTER AND EMERGENCY SERVICES **Wheatland County** ..... Office: 632-5614  
Les Christensen (DES Coordinator) ..... Home: 632-4615  
Montana Disaster and Emergency Services Division (Helena) ..... 841-3911
  4. EVACUEES  
Evacuation will be coordinated by:  
Steve Riveland (Sheriff)  
~~Ray Piddock~~ (DES Coordinator) *David Jones*  
~~Roger Lindsley~~ (Fire Chief)
- 

B. Priority Two

1. LOCAL ENGINEERS

NRCS – Bozeman ..... 587-6828  
Jim Suit *Steve Becker* ..... Home: 587-0857

2. MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

Dam Safety Program Engineers: ..... Office: 444-6613 / 6664  
Ms. Michele Lemieux ..... Home: 225-9062  
~~Mr. Terry Voeller~~ ..... ~~Home: 442-9638~~  
Water Operations Bureau ..... Office: ~~444-6610~~ *444-6816* *444*  
Mr. Laurence Siroky, Bureau Chief ..... Home: 442-2806  
Lewistown Office ..... 538-7459  
Sterling Sundheim ..... Home: 538-8957

3. NATIONAL WEATHER SERVICE

Great Falls ..... 453-9642  
Billings ..... 652-2314



**APPENDIX D**  
**Dam Incident Report Form**



## APPENDIX D

### Dam Incident Report Form

DATE \_\_\_\_\_ TIME \_\_\_\_\_

NAME OF DAM \_\_\_\_\_

STREAM NAME \_\_\_\_\_

LOCATION \_\_\_\_\_

COUNTY \_\_\_\_\_

OBSERVER \_\_\_\_\_

OBSERVER TELEPHONE \_\_\_\_\_

NATURE OF PROBLEM \_\_\_\_\_

LOCATION OF PROBLEM AREA (Looking Downstream) \_\_\_\_\_

EXTENT OF PROBLEM AREA \_\_\_\_\_

FLOW QUANTITY AND COLOR \_\_\_\_\_

WATER LEVEL IN RESERVOIR \_\_\_\_\_

IS SITUATION WORSENING? \_\_\_\_\_

EMERGENCY STATUS \_\_\_\_\_

CURRENT WEATHER CONDITIONS \_\_\_\_\_

ADDITIONAL COMMENTS \_\_\_\_\_



## APPENDIX E

### Emergency Action Plan Distribution List

<u>PLAN HOLDER</u> .....	<u>NUMBER OF COPIES</u>
Dam Owner, City of Harlowton, Mayor's Office .....	2
Dam Tender, John Crowley, City Engineer .....	1
Wheatland County Sheriff .....	1
Harlowton City Police .....	1
Local DES Coordinator.....	1
DNRC Dam Safety Program.....	1